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Nose and sinus tumours:

red flags and referral

INTRODUCTION

Sinonasal tumours are rare, accounting for 3% of all head and neck malignancies and <1% of all malignancies.[1–4] In addition to rarity, they present with nonspecific and often seemingly benign symptoms, which makes them difficult to diagnose early. Awareness of sinonasal tumours as an entity and familiarity with the key and often misinterpreted symptoms is essential for early diagnosis. This article examines the symptoms, signs, presentation, investigation, and management of nasal and sinus neoplasia, and details the 'red flags' that should trigger specialist referral.

ANATOMY

The sinuses are four pairs of air-filled bony chambers within the facial skeleton and anterior skull base region. The four pairs are the frontal, ethmoid, maxillary, and sphenoid.

Their location in the skull dictates that they are surrounded by complex anatomy. Therefore, malignancy can present in many ways and can affect many structures (Box 1).

Using tumours of the maxillary sinus as an example:

- T1 — tumour limited to the maxillary sinus with no erosion or destruction of bone (these tumours seldom produce symptoms and are thus very rarely detected);
- T2 — tumour causing bony erosion or destruction including extension into the

Box 1. Anatomical spread and relevant symptoms

Tumour spread	Spread/structure	Symptom
Frontal	• Inferior: orbit and contents • Anterior: skin • Posterior: brain	• Proptosis • Visible extrusion • Neurological sequelae
Ethmoid	• Superior: anterior cranial fossa • Anterior: lacrimal region • Medial: nasal cavity • Posterior: optic nerve • Lateral: orbit (lamina papyracea)	• Neurological sequelae • Lacrimal swelling • Nasal obstruction, epistaxis, nasal discharge • Visual disturbance • Proptosis
Maxillary	• Superior: orbit • Inferior: alveolus • Anterior: skin • Posterior: pterygopalatine fossa (maxillary artery, branches of trigeminal nerve) • Medial: nasal cavity • Lateral: skin and bone	• Proptosis diplopia • Dental pain, ill-fitting dentures, loose teeth • Neuralgia • Nasal obstruction
Sphenoid	• Superior: sella turcica, pituitary, middle and anterior cranial fossa • Inferior: nasal cavity • Anterior: nasal cavity • Posterior: clivus, pituitary, optic nerves, cranial nerves • Lateral: cavernous sinus, internal carotid artery, cranial nerves II–VI	• Intracranial intrusion (confusion, meningitis) • Diplopia secondary to cranial nerve disruption

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Box 2. Symptoms of sinonasal carcinoma[5]

- Unilateral nasal blockage
- Unilateral bloody nasal rhinorrhoea
- Ill-fitting dentures or loose teeth secondary to swelling of buccal soft tissues
- Swelling at medial canthus
- Facial pain
- Hypoesthesia/numbness of cheek
- Headaches
- Visual disturbances; diplopia and propotosis (late)

REFERENCES

1. Le QT, Fu KK, Kaplan M, *et al.* Treatment of maxillary sinus carcinoma: a comparison of the 1997 and 1977 American Joint Committee on cancer staging systems. *Cancer* 1999; **86(9):** 1700–1711.
2. Tiwari R, Hardillo JA, Mehta D, *et al.* Squamous cell carcinoma of maxillary sinus. *Head Neck* 2000; **22(2):** 164–169.
3. Tufano RP, Mokadam NA, Montone KT, *et al.* Malignant tumors of the nose and paranasal sinuses: hospital of the University of Pennsylvania experience 1990–1997. *Am J Rhinol* 1999; **13(2):** 117–123.
4. Rinaldo A, Ferlito A, Shaha A, Wei WI. Is elective neck treatment indicated in patients with squamous cell carcinoma of the maxillary sinus? *Acta Otolaryngol* 2002; **122(4):** 443–447.
5. NHS Employers. *2016/17 General Medical Services (GMS) contract: guidance for GMS contract 2016/17.* 2016. http://www.nhsemployers.org/~/media/Employers/Documents/Primary%20care%20contracts/GMS/2016%2017%20GMS%20guidance.pdf (accessed 15 Mar 2017).
6. Lund VJ, Clark PM, Swift AC, *et al.* Nose and paranasal sinus tumours: United Kingdom National Multidisciplinary Guidelines. *J Laryngol Otol* 2016; **130(Suppl 2):** S111–S118. DOI:10.1017/S0022215116000530.
7. Acheson ED, Cowdell RH, Hadfield E, Macbeth RG. Nasal cancer in woodworkers in the furniture industry. *BMJ* 1968; **2(5605):** 587–596.
8. Luce D, Gérin M, Leclerc A, *et al.* Sinonasal cancer and occupational exposure to formaldehyde and other substances. *Int J Cancer* 1993; **53(2):** 224–231.
9. Yamaguchi KT, Shapshay SM, Incze JS, *et al.* Inverted papilloma and squamous cell carcinoma. *J Otolaryngol* 1979; **8(2):** 171–178.
10. Mansell NJ, Bates GJ. The inverted Schneiderian papilloma: a review and literature report of 43 new cases. *Rhinology* 2000; **38(3):** 97–101.

hard palate and middle nasal meatus (symptoms may include nasal obstruction, congestion, or dental pain);

- T3 — tumour invades further, for example, into subcutaneous tissues or orbit (nasal obstruction, bleeding, and visual disturbance (diplopia may occur); and
- T4a/T4b — tumour invades extensively, for example, into anterior orbital contents, skin of cheek, pterygoid plates, infratemporal fossa (symptoms as with earlier stages, with proptosis and pain and headache from cheek swelling being reported), orbital apex, dura, brain, middle cranial fossa, cranial nerves other than maxillary branch of the trigeminal nerve, nasopharynx, or clivus.

The stages of disease clearly show progressive stepwise invasion of vital structures with concurrent reduction in chance of cure with each incremental stage.

HOW COMMON IS IT?

As previously discussed, sinonasal malignancies are rare, with an incidence of around 1/100 000 per annum.[3–4] Considering that an average UK GP list is around 7000[6] a patient with sinonasal malignancy may only be diagnosed every 15 years by an individual GP. Their scarcity means there have been very few large-scale trials looking at outcomes, and most individual studies are limited to around 100 patients treated in a heterogeneous manner.

WHO GETS IT?

Any age and gender can be affected. There is, however, a male predisposition and patients in their fifth to seventh decade of life appear to be the most commonly affected. There is also a strong association in some tumours with environmental factors, in particular occupational exposure. Evidence shows that woodworkers have a 500–900 times greater incidence of adenocarcinoma of the ethmoid sinus than that of the standard population.[7] Exposure to formaldehyde is also associated with an increased risk of developing both sinonasal squamous cell carcinoma (SCC) and adenocarcinoma.[8] Unlike other head and neck malignancies, there does not appear to be a major correlation between tobacco smoking and the development of sinonasal malignancies. There is growing evidence that the human papilloma virus, in particular subtypes 16 and 18, are implicated in the development of sinonasal SCC, although the reported rate of associated carcinoma differs widely from 0–53%.[9,10] Inverting papilloma, a benign locally invasive tumour of the sinonasal cavities has a well-defined risk of transforming into carcinoma.

HOW DOES IT PRESENT?

There are key indicators that should act as triggers for early referral. In general, unilateral nasal symptoms (for example, unilateral nasal obstruction), especially if the symptoms are grouped (for example, unilateral nasal obstruction, unilateral blood-stained discharge, and unilateral pain or orbital symptoms), should be seen as red flags. Possible presenting symptoms are listed in Box 2.

WHAT ARE THE RED FLAGS?

When dealing with patients, the above key symptoms can distinguish between probable benign conditions from potentially serious issues. However, paramount is whether or not the symptoms are unilateral. Benign conditions such as rhinosinusitis do not usually present in a unilateral fashion and issues such as unilateral nasal blockage will require ENT investigation regardless of cause. It would be more appropriate to refer a patent with unilateral sinonasal symptoms rather than treating with topical steroid sprays or decongestants in primary care. A high level of clinical suspicion is essential for early diagnosis, and therefore when unsure a referral of a patient with sinonasal symptoms may be the safest option.

WHEN TO REFER?

For most primary care doctors sinonasal malignancy may be a once in a career diagnosis and easily missed. Advances in endoscopic resection and chemoradiotherapy have resulted in early-stage disease being eminently treatable. If the clinical presentations discussed in this article are kept in mind, this rare and difficult diagnosis may be more easily spotted at an earlier stage, with resulting improved patient outcomes. In particular we recommend that recent-onset unilateral nasal symptoms be considered as potentially important.

Provenance

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Competing interests

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